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CREATION OF AN ETF THAT CAN TRACK SOCIAL MEDIA IMPACT ON A DYNAMIC "MEME STOCK" PORTFOLIO.

JUAN DIEGO PATERNINA MARTINEZ

Work project carried out under the supervision of:

GIORGIO OTTONELLO

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Abstract

The impact of social on financial markets has been highlighted through 'Meme Stocks'. This paper examines social media trends' effect on meme stock portfolios, focusing on discussions on Reddit's *wallstreetbets* subreddit. Using historical real-time data from the subreddit and financial information form CRSP, a multiple dynamically adjusting portfolio are constructed and examined. Testing for various optimization methods, rebalancing periodicity, also, size and industry partitions are examined, finding that a daily minimum variance Financial 'meme stock' portfolio is the best type to track. This research provides insights into the potential of social media-driven trading strategies and their implications for investors.

Keywords

Meme stocks, social media, financial markets, Reddit, Wallstreetbets, retail investors, trading strategies.

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INTRODUCTION

In recent years, the phenomenon of social media's impact on financial markets has been an interesting topic of conversation, especially when it comes to "meme stocks" – stocks that fluctuate in price at high velocity due to discussions and organization through social media platforms.

This phenomenon made it to the mainstream news in early 2021 during the GameStop short squeeze, where coordinated retail investors, from the highly popular *wallstreetbets* subreddit, caused the price of the stock to reach highly abnormal values for quick profits, affecting the volatility of this and multiple other stocks, that were popularly used by hedge funds in their short strategies, leading to massive losses for institutional investors, and enormous gains for some lucky retail investors that got in the "hype" early enough. Those that got in too late were met with the market readjusting, the famous Robin Hood app that was being used by most retail investors stopped the trading of the stock, unless it was for selling, with many slow investors ending up with big losses.

The purpose of this work is to systematically look at and quantify the impacts of social media trends on stocks using data from *wallstreetbets* to build and optimize a dynamic 'Meme Stock' portfolio, to see if this kind of portfolio is something worth investing in.

First, a literature review is done examining three papers about the topic of 'Meme Stocks', social media communities, and financial literacy affected by retail trading and social media.

Then, moving into the methodology and its results, which consist of a historical analysis of stocks mentioned in the *wallstreetbets* subreddit using the advanced tracking tool 'YoloStocks.live', which collects and pools together live data of stock tickers mentioned in the 'YOLO' category with a sentiment analysis for each post. This data is then integrated with

financial metrics from CRSP to construct a dynamically adjusting portfolio in response to social media trends.

We also examine the impact on the portfolio depending on rebalancing periodicity, optimization methodology, and firm size and industry.

This is a comprehensive study and henceforth provides insights into how retail investor behavior may change with increased social media-driven trading activity and the prospect of generating returns. This work adds to the emerging literature on the intersection of social media and financial markets and provides practical implications for investors who want to take advantage of meme stock trends.

LITERATURE REVIEW

The literature and research on 'meme stocks' and their effects on financial markets has seen considerable growth, pushed by the 2021 Short Squeeze. In their paper 'On the "mementum" of meme stocks', Costola, Iacopini, and Santagiustina (2021) delve into the concept of 'mememtum' in 'meme stocks', aiming to dissect the intricate dynamics between stock prices, trading volumes, and social media activity. 'Meme stocks', characterized by coordinated efforts through social media platforms like Reddit and X (Twitter), have garnered significant attention due to their profound impact on market behavior, which comes from the ability of retail investors to synchronize buying signals, effectively enabling small investors to exert influence akin to that of large institutional investors. This collective action was exemplified in 2021, as mentioned before, when U.S. video game retailer company GameStop had a dramatic price surge early in the year, a surge that was orchestrated by users of the *wallstreetbets* subreddit, where the volatility and trading volume of the stock had a substantial increase, leading to the unheard-of rapid price increase.

Costola, Iacopini, and Santagiustina (2021) provide empirical evidence that 'meme stocks' exhibit unique patterns in their price movements, trading volumes, and social media mentions. They propose a metric for measuring stock-related meme activity that focuses not on sentiment but on the coordination of retail investors through online discussions. Using a regime-switching cointegration model, they identify the distinct "mememtum" that characterizes 'meme stocks', which differs from other stocks with high social media activity. Their findings indicate that this "mememtum" is both significant and positively correlated with stock returns, offering valuable insights for market regulators and investors alike.

Additionally, their study contributes to the deeper understanding of how social media-driven coordination among retail investors can profoundly influence market dynamics. By shedding light on the behavioral and financial impacts of 'meme stocks', this research adds to the growing body of literature on the intersection of social media and financial markets, emphasizing the need for continued investigation into this evolving topic.

The paper 'A Note on GameStop, Short Squeezes, and Autodidactic Herding: An Evolution in Financial Literacy?' by Tony Klein (2022) examines the connection between the GameStop short squeeze and financial literacy, with a focus on how the event influenced the understanding of financial concepts, market mechanisms, and the role of social media communities in educating retail investors. Klein (2022) highlights the surge in interest in financial basics, particularly those related to short squeezes and derivatives, following the GameStop phenomenon.

Furthermore, Klein (2022) underscores the importance of self-directed learning literacy, especially in the context of social media platforms like Reddit, which played a pivotal role in disseminating information and advice during the GameStop event. Klein (2022) argues that this event had a positive impact on the financial literacy to evaluate the long-term effects of such events on financial understanding and investment performance.

Finally, Klein (2022) also poses significant questions for future research, such as the potential influence of heightened financial literacy on hedge funds business models – many of which suffered significant losses during the short squeeze – and the broader implications for market stability and regulatory policies. Ultimately, Klein (2022) offers valuable insights into the shifting landscape of financial literacy in the wake of market disruptions, emphasizing the role of social media in educating and shaping the behavior of individual investors.

In their paper 'Place Your Bets? The Market Consequences of Investment Research on Reddit's Wallstreetbets', Bradley, Hanousek, Russell, and Zicheng (2023) explore the evolution of "Due Diligence" (DD) posts on the *wallstreetbets* subreddit, particularly in the wake of the GameStop short squeeze. DD posts, which traditionally included thorough financial analyses and clear investment recommendations, were once considered valuable resources for predicting returns, often within a one-month horizon. These reports provided insights into media trends, overall stock sentiment, and anticipated cash flows.

However, Bradley et al. (2023) find that following the GameStop phenomenon, there was a noticeable shift in the nature of these DD posts. The subreddit experienced a surge in popularity, and with it came a focus on price pressure strategies aimed at 'Meme Stocks'. This shift resulted in a decline in the quality of DD reports, diminishing their usefulness for less experienced, less sophisticated investors. The decrease in report quality after the GME event also triggered subsequent trading frenzies, which led to significant losses for many small traders. This demonstrated that the extraordinary gains witnessed during the initial GameStop surge were not easily replicated, contrary to the expectations of the millions of new members who joined the subreddit following the event.

Overall, Bradley et al. (2023) find that DD reports, once a crucial source of insight for novice investors on *wallstreetbets*, lost much of their value as a result of the subreddit's meteoric rise in popularity. The focus on a single, highly speculative strategy undermined the informative

nature of these reports, leading to monetary losses and a dilution of the site's original purpose. However, as the hype subsides, the subreddit could potentially regain its value as a resource for investors and regulators alike, serving as a tool for monitoring market disruptions and offering solid investment recommendations.

In conclusion, the literature on 'meme stocks' underscores the critical role of social media as a coordination mechanism for retail investors. It highlights the importance of understating the dynamics of 'meme stocks' and their effects on stock prices and trading volumes. Further research on this topic is essential for developing a comprehensive understanding of the implications of 'meme stocks' on financial markets and for informing investor decision-making processes.

DATA

Real-time tracking of *wallstreetbets* is not an easy task, luckily '*YoloStocks.live*' is an advanced and accurate public tool created by data scientist Youyang Gu, which aims to "track stock ticker mentions being discussed in every comment & thread from multiple Reddit subreddits and aggregate them live, so you know exactly which meme stocks are trending and when.". Additionally, they offer historical data for all daily stock mentions from 2021 (the birth of meme stocks in the GME short squeeze) until 2023. This is the information used for tracking daily trends to create and optimize the portfolio.

The information available to download included all the top 100 stocks mentioned in the subreddit day by day, we filtered those days into trading days and saved the unique tickers of the top 20 trending stocks for each day, getting 204 unique tickers. Table 1 shows the overall top 20 talked about stocks for each year, we can see that some stocks are present throughout the three years, like GME, AMC, TSLA, PLTR, SPY, APPL, and AMD, with the first three being

popular ‘meme stocks’ either born from the 2021 short squeeze or, in TSLA case, made a ‘meme’ by its founder and community following.

On a daily basis, these rankings can change, multiple stocks may enter and exit the top 20, some may even change names (like it was with FB to META), and others may be delisted either from being bought by a private party (TWTR) or going bankrupt (BBBY), these changes in trends and ticker names it’s what led to the 204 unique tickers mentioned before.

After getting the ticker names, from Wharton Research Data Services (WRDS) we downloaded the daily price, returns, outstanding number of shares, and SIC code for all 204 stocks from the CRSP for the last 8 years.

Looking at the popular common stocks for all three years in Table 2, we can see most of them have high volatilities, especially the famous ‘meme stocks’ GME, AMC, and TSLA, however, the first two are the ones with the highest annualized returns, due to them being popular in the short squeeze and easy to manipulate, which will be further explained later on. Additionally, all data was transformed into weekly and monthly dates as well.

Furthermore, for the Benchmark and Market returns information for comparing and calculating the Information Ratio the S&P500 data from 2021 to 2023 is used. Also, for the Sharpe Ratio, the risk-free rate comes from the 10-year Treasury US Bill Yield.

Moving on, from the 204 unique tickers in the database, a lot of them are from different industries and of varying sizes. Therefore, we wanted to look at how results would differ if we were to select stocks from the top 15 trending stocks based on industry or size.

First, doing the size analysis, we categorized the companies daily based on their value ($price * total\ outstanding\ shares$), Large companies are the ones with a market capitalization of over $10 billion, Mid companies are between $2 and $10 billion and Small companies are below $2 billion. To illustrate the categorization, using the same 7 stocks as before, Table 3 shows the market cap of each company as of December 22, 2023, and its Size

categorization based on the parameters set. Table 4 shows how many stocks as of December 22, 2023, fall into each size, with most being Large, followed by Small, and then Mid.

Then, to categorize the companies by Industry, the Standard Industrial Classification (SIC) codes are used, extracted from the CRSP. When using the SIC Major Codes for the 204 tickers we get 31 unique industries, however, when using the Sections from A to J, we get 8 unique industries. The latter is the preferred categorization, as the portfolios would only draw from the Top 15 stocks, and so the less the number of industries to categorize for the more stocks can fit into each one and a better diversification effect can be reached. The unique industries for categorization are seen in Table 5 with the number of stocks in each industry, with Finance, Insurance, and Real Estate having the most stocks, followed by Public Administration and Manufacturing. Also, in Table 6 we can see the industry each of the popular stocks belongs to.

METHODOLOGY

In this section, we detail the processes and techniques used in the creation and evaluation of an ETF designed to track the impact of social media on a dynamic 'Meme Stock' portfolio. This study focuses on leveraging data from social media platforms, particularly Reddit's infamous *wallstreetbets* subreddit, to identify and optimize the portfolio of stocks that are frequently discussed and are subject to significant price movements due to social media users' meddling. This section outlines the steps taken to construct the portfolio, the optimization techniques employed, the selection of the rebalancing window, and the performance metrics used for evaluation.

To make the dynamic portfolio, for each date, the top 15 trending stocks from the WSB data are picked, and then from the CRSP data the returns from the last 5 years are used to

optimize the portfolio weights, consisting of these 15 stocks, this process is then repeated each date, constantly changing the stocks that make up the portfolio while following the WSB trends.

For the portfolio weights optimization, a minimum weight of 1% for each stock is required, this way ensuring the portfolio has the highest number of stocks in it.

Furthermore, sometimes the ticker does not match the tickers available from the CRSP, when this happens the ticker is discarded for that date and the next available one in the Top 20 is used, this way ensuring we have the closest amount to 15 stocks in the portfolio each date.

Additionally, sometimes the ticker has not been in the NYSE for the time 5 years required for the optimization, the optimization method therefore uses all the available data, whether it be 4 years or 1 year, as it uses annualized metrics for its process.

To find which optimization methodology was best for the portfolio and what was the best rebalancing time window we used the Maximize Sharpe Ratio method, the Minimum Variance Method, and a naïve Equal Weighted method, with daily, weekly, and monthly rebalancing. Figure 1 shows the results of the Minimum Variance optimization process with monthly rebalancing, giving a clear picture of how the portfolio is constantly changing its stocks and weights, for those that remain for an extended period of time. When done with a monthly rebalancing, from the 204 stocks available in the data, a total of 109 stocks have rotated in the portfolio only from 2021 to 2023, when done with daily rebalancing the total rotated stocks rise to 158. Additionally, Figure 2, shows the rebalancing weights for the equally weighted portfolio also with a monthly rebalancing, making it easier to see that it's constantly achieving the goal of having 15 stocks in the portfolio, while also changing its internal composition.

For each portfolio, annualized mean returns and volatility, Sharpe and Information Ratio, and maximum and minimum value achieved are calculated, to compare and pick the best one.

After finding the best optimization method and rebalancing window, we want to analyze how portfolios based on Size or Industry categorization can impact results if they can be improved, or if it leads to worse results.

First, doing the size analysis, all three portfolios to be formed need to have at least 3 stocks, to get the diversification effect in them, however, sometimes the trending stocks can be more inclined into one or two sizes, for when this happens, the qualifying size stocks from the date before are added to the current date, to use in the optimization process. Also, if this is not enough, then the portfolio holds the stocks it currently has with the last optimized weights until it can re-optimize itself based on the trends.

Moving on to the industry analysis, the methodology is the same as with the size portfolios, however, portfolios are partitioned depending on the industry they belong to and the minimum number of stocks is now 2, due to so many industries being available, this way we get more consistent data in the time period. For all portfolios, the same metrics as before are calculated to compare and analyze.

RESULTS

Moving on to the results, the three optimizing methods to be used for portfolio weights allocation are the Max Sharpe Ratio, the Minimum Variance, and a naïve simpler method of just Equal Weights for all stocks in the portfolio.

By using Maximum Sharpe Ratio, we hoped to optimize the portfolio best for risk-adjusted returns, Minimum Variance for reducing as much as possible the volatility of the portfolio, and the Equal Weighted method for simplicity and a case study if it somehow leads to better results. The final choice is whichever method offers the best possible performance, not just by itself but by comparing it against the chosen market benchmark, the S&P500.

First, Figure 3 shows the portfolio performance of the daily rebalanced portfolios based on the method of optimization vs the S&P500. Both the Minimum Variance method and the Equally Weighted portfolio outperform the benchmark throughout the entire time, however, the Max Sharpe Ratio method after July 2022 falls below the benchmark and never recovers. The Min Variance portfolio outperforms all portfolios in the end, by the end of 2023 it's above $2.500, Equi Weighted is slightly above $1.500 and the Max Sharpe Ratio barely surpasses the initial value of $1.000 after 3 years.

For the weekly rebalancing, Figure 4 shows the performance of each portfolio, where we get very similar results as with the daily rebalancing, with Min Variance outperforming all portfolios, followed by Equi Weighted, the benchmark, and lastly the Max Sharpe Ratio underperforming. However, unlike with the daily rebalancing, the final gap between Min Var and Equi Weighted is very small with both not going above $1.400 in the end.

Finally, for the monthly rebalancing, the results in Figure 5 show that no method manages to outperform the S&P500, with the Max Sharpe Ratio reaching the highest value out of the three slightly above $1.100, followed by Equi Weighted barely above $1.050 and the Min Variance portfolio loses money by being below the initial value invested of $1.000.

Summarizing the results of each portfolio and method, Table 7 shows the key metrics for all scenarios, where we can see the daily rebalancing has the overall best result in all optimization methods in annualized returns, however, it also comes with the highest overall volatility. Looking at Sharpe, no method nor time window goes above 1, therefore their risk-adjusted returns are not worth it. As for the Information Ratio, the Min Variance method with Daily rebalancing has a very good result, above 0.5, with a 0.93, while no other portfolio manages to go above the base good value. In conclusion, the best optimization method for this meme portfolio is the Minimum Variance method, with a daily rebalancing window.

A possible explanation for why the daily rebalancing has the overall better results is that due to the stocks being picked from social media trends, these are very short-term social dynamics that are best-taken advantage of the shorter the time window is, offering the best results by rotating trending stocks more rapidly and not holding on to them too long where the social media inflated price would have been reversed. This can be further observed in the rebalancing turnover, whereby following the fast-moving trends, on average 37% of the portfolio is changed every day.

Moreover, looking at the performance of the Min Variance portfolio with daily rebalancing, some particular dates can be observed and their effect on the portfolio's value, the event that led to the inspiration of this project can be observed, the Game Stop short squeeze of 2021 from the very beginning of 2021 where the value of the portfolio almost immediately goes up taking advantage of the phenomenon, not only on GME but other affected stocks like AMC, TSLA, BBBY, etc.

Also, a high-value event happened on October 21, 2021, where the merger news of DWAC for the creation of Trump's social media platform would lead to an increase in its stock of 350%. Furthermore, another interesting event to look at is the beginning of the Russia – Ukraine war on February 24, 2022, where we can see the immediate effect was a reduction in value, however, it would not last nor leave a meaningful impact on the portfolio. Overall, 2022 was a year of losing value for the portfolio, from January the value of the portfolio started to decrease, not very rapidly but it is a steady decline with only at the very end it starting to pick up, and by 2023 the growth keeps on going.

It's interesting to note that the Min Variance portfolio, out of the gate has the slowest growth, however after it grows in value with the DWAC hike, it's the portfolio that manages to keep its value steadier, leading to smaller losses, which is shown with it having the smallest volatility between the other methods.

Furthermore, Figure 3 shows how the ‘mememtum’ from Costola, Iacopini, and Santagiustina (2021) can be observed throughout 2021, where the coordination of retail investors leads to quick and high changes in value, especially in the direction of positive returns. However, the decline in value, although not as fast as the rise, is still a steep fall as mentioned by Bradley et al. (2023), where the extraordinary gains first witnessed by the coordination are not achieved by all participants, then when the heavy losses come retail investors are left disappointed and unmotivated. It can be seen that from 2022 onward the ‘mememtum’ from social media conversations is not as strong as it was in 2021, this could be for multiple reasons like loss of trust in the coordination efforts due to heavy losses, or the effect of the restrictions made by popular trading site Robin Hood when coordination is afoot, like freezing the trading of certain stocks, like GME.

Moving on, after finding that Minimizing Variance and rebalancing daily is the best method to maximize returns while minimizing volatility, this method is now applied to the creation of the portfolios based on Company Size.

From this we get the following results shown in Figure 6 with the performance of all 3 portfolios’ performance against the market benchmark, where the Mid portfolio is the only one that manages to beat the benchmark in the end, however for most of the time all portfolios are below the benchmark. Looking at the summary of results in Table 8 we can see that both the Mid and Small have the best Sharpe and Information ratios, but not favorable ones, having also massive volatilities and low alphas, although not significant ones.

These results are consistent with the effects retail investors can have on the volatility of companies, it’s not easy to significantly alter the price of a Large company, which is heavily traded with a large number of outstanding shares in many different types of investors, however when the focus is on Mid or Small size companies, we can see the effects are drastically augmented, both in returns and volatility. Furthermore, the average daily turnover changes

significantly for each size category, this is due to the availability of stocks for each size in the optimization method, where there's only a 10,66% daily average turnover for the Small portfolio, 25,96% for the Mid and the highest being 32,52% for the Large portfolio.

Going back to the original phenomenon, GME was a Small cap company, therefore it was easy to meddle with and severely alter the price of, once it started to trend, so much that for a couple of days it even went on to be a Large cap company, the same happened to AMC and BB, other famous stocks of the Short Squeeze from 2021. Figure 6 shows how much volatility is added to Small and Mid-sized companies, more specifically during 2021 when the *wallstreetbets* subreddit was more actively trying to affect the market. After 2021 however, the effect of targeting by size is lessened, making it an even worse investment decision underperforming for the entirety of 2022, which was previously mentioned to be an overall poor year for 'meme stocks' portfolios, due to loss in the strength of 'mememtum' induced by social media coordination. Going into 2023, the Small portfolio continues to lose value, however, the Mid portfolio starts to pick up, and the Large continues to underperform with low volatility.

Moving on to the industry analysis, using the daily rebalancing and Minimum Variance optimization, the results seen in Figure 7, show that the best-performing industry portfolios outperforming the S&P500 are Finance, Manufacturing, and Services, however, Transportation, Public Administration, and Retail industry fail to beat the benchmark.

Additionally, in Table 9 we can see the summary of results for each industry type, where the best-performing industry is Finance, with the highest mean returns and the lowest volatility, as well as a better Sharpe ratio than Manufacturing. Furthermore, we see that the Mining and Construction industry has no data, as not enough companies from those industries were ever in the top 15 trending stocks of the day. We see this availability of stocks heavily affecting the turnover of the Transportation and Retail industries, with 2,92% and 5,28% daily average respectively.

The most volatile portfolios are consistent with the type of stocks that can go viral on social media, manufacturing, and services are the industries where most of the stocks from the 2021 short squeeze fall into. GME is part of the Services industry, and its effect on the portfolio can be seen very early on, with this industry having the highest volatility after the Retail Trade one, where AMC is.

The Finance portfolio has the best overall results, with a good Sharpe Ratio above 1, and an Information ratio of 0.98, way above the baseline of 0.5 to be considered better than the benchmark, as it has the lowest volatility we have seen in daily rebalanced portfolios while still achieving high annualized returns. These types of stocks may not be as "memeable" or recognizable as other stocks, however, they still find themselves being the topic of conversation on *wallstreetbets* leading to a solid performance in its portfolio type. The Manufacturing portfolio does not achieve a good risk-adjusted metric with its Sharpe Ratio, however against the S&P500 the Information Ratio is 0.81 which is a very good result, and no other portfolio manages to have a good IR.

Furthermore, in Figure 7 it can be observed that after 2022 the performance of the best-performing industries, and therefore the conversation around them in social media, becomes better at expecting high returns. This can be perhaps attributed to an improvement in the way the *wallstreetbets* subreddit works, after all the noise made in 2021 and the expectations for 2022 that led to underperformance, the subreddit is not as popular as it was during the 2021 short squeeze. Figure 8 shows the daily ticker mentions in the subreddit, a massive increase in the middle of January can be seen when the short squeeze began gaining popularity and the social media coordination was beneficial to participants.

After the short squeeze and after things balanced out again, Figure 9 shows how the activity of the subreddit declined heavily and steadily throughout the rest of the year, and just like most social media trends, it mostly died down, in Table 10 it can be seen that YoY from

2021 to 2022 the activity in the subreddit declined by 69% and from 2021 to 2023 it declined again another 50%.

Therefore, the loss of activity in the subreddit could have led to what Bradley et al. (2023) mentioned in their work, whereas the hype died down perhaps the subreddit has regained the positive value it once had in making more informed reports and not just highly speculative strategies based on hype and jokes.

CONCLUSION

Overall, these results show that perhaps the focus of a meme stock portfolio should be on trending stocks to get high returns, filtering out companies based on size and industry type. First, the smaller the size of the company the more possible it is to change its price significantly if for a short period of time, to make quick high returns when retail investors are coordinated, however, we have seen this trend has then declined since 2021, probably due to the high losses after the market readjusts, making the strategy way too risky for retail investors. Alternatively, filtering from industry type could lead to better results in terms of volatility, compared to size, when looking at industries like Finance, where the effects of social media are not as hard felt, however when following the trends and conversations around it led to the best-performing portfolio, keeping high returns with lower volatility.

Investing in ‘meme stock’ portfolios may not be a sound investing decision, volatilities are high for the returns they offer, we see this in the Sharpe Ratio where every portfolio, with the only exception being the Finance one, has a value below one. It’s worth noting that the Min Variance Daily portfolio has a Sharpe Ratio of 0.98 which is not a good result, but it is very close to the edge to be considered so. As for the Information ratio, where values above 0.5 are considered good, the Finance Portfolio, the Min Variance Daily portfolio, and the Manufacturing portfolio have the best results, respectively.

In conclusion, this study provides valuable insights into the intersection of social media and financial markets. It demonstrates that while meme stock portfolios can offer high returns, they also come with increased volatility and risk that in every case, but one or two exceptions, make those returns not worth it. Therefore, by considering additional factors such as firm size and industry, investors can better navigate the dynamics of meme stocks and potentially achieve more stable performance, as is the case with the Financial portfolio.

As for the original question of whether or not this kind of portfolio is something worth doing or not, we can conclude that yes, a dynamic 'meme stock' portfolio, optimized using minimum variance and with a daily rebalancing window, that only includes trending companies in the Financial, Insurance, and Real Estate industry, it's a good risk-adjusted investment that is better than the S&P500, at least for the time period tested.

Furthermore, the subreddit has lost much of its once problematic activity and may once again be turning into a useful tool for investors, not so much guided by 'memes' and hype but by more informed decisions. One look at the subreddit nowadays and it can be observed that the once popular 'DD' posts mentioned by Bradley et al. (2023), aren't as popular as they once were, however, the 'YOLO' category, born out of the jokes and momentum from the 2021 phenomenon now has very informed posts that aren't just banking on the possibility of quick coordination but are trying to give informed advice to other members and so, as noted in their paper, the nonsensical posts that bled into the 'DD' posts in 2021 from the 'YOLO' side may have shifted the activity from the 'DD' into the meme category, changing it nowadays for the better.

To conclude, the subreddit may once again be a place worth getting information from, and with the portfolio tracking its current community the results in the future may be even less volatile and good returns, that is until the next hype wave comes.

FINAL REMARKS AND FUTURE IMPLICATIONS/USE CASES

It's worth noting that financial performances do not include transaction costs, which are known to decrease the performance of portfolios, especially depending on how often the portfolio composition is changed. We have established that the best portfolio is the Financial industry portfolio due to its metrics of annualized returns and volatility, risk-adjusted returns, and performance compared to the market benchmark, however, it's very likely that with transaction cost, the Sharpe Ratio that barely surpasses 1.0 would go down, and the effect on the Information Ratio would also be detrimental. Therefore, the actual performance of the portfolio would tip it over the not recommended category, like all the others.

Nonetheless, the usefulness of a 'meme stock' portfolio can be argued whether it be for risk exposure to social media trends in a portfolio of portfolios, or just trying to track trends in stocks or industries that can be easily affected by social media coordination to avoid certain stocks or pivot any other asset strategies an investor may have at the moment, to minimize risk, losses or maximize returns.

Finally, the end goal of the methodology used for creating the portfolios would be to apply in a real-time ETF, connected to the YoloStocks tracker, gathering the trending stocks of the day, adjusting the portfolio, and comparing it in daily to other metrics. This ETF can even become multiple ones, according to the results of the project, first a full portfolio that tracks and includes the top 15 trending stocks, a second one that tracks and includes only companies in the Financial, Insurance, and Real Estate industry, and a final one that tracks trending companies in the Manufacturing industry.

In conclusion, this Work Project offers a nuanced perspective on the viability of 'meme stock' portfolios. While these can provide high returns, they come with increased risk and volatility, making them a challenging yet potentially rewarding investment option, especially when incorporating certain filters. This research ultimately suggests that with careful

management and strategic optimization, ‘meme stock’ portfolios, especially those focused on less volatile sectors, can offer a potentially valuable addition to an investor’s portfolio. However, the success of such strategies is heavily dependent on timely execution, constant monitoring, and an understanding of the underlying social media dynamics that drive stock movements. Finally, in summary, this Work Project provides valuable insights into how social media can drive market dynamics and offers a structured approach to harnessing these trends for investment purposes, albeit with caution due to the inherent risk involved.

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APPENDIX

Ranking	2021	2022	2023
1	GME	GME	TSLA
2	AMC	BBBY	NVDA
3	BB	TSLA	SPY
4	TSLA	SPY	NFLX
5	PLTR	AMC	FRC
6	SPY	NFLX	QQQ
7	NOK	NVDA	AAPL
8	CLOV	AAPL	AMD
9	RKT	AMD	AMC
10	WISH	QQQ	MSFT
11	AAPL	VIX	BBBY
12	AMD	TWTR	VIX
13	SNDL	AMZN	GME
14	SLV	FB	SVB
15	NIO	PLTR	SPX
16	UWMC	F	PLTR
17	TLRY	SPX	AMZN
18	MVIS	SOFI	BTC
19	BABA	MSFT	PYPL
20	SPCE	TLRY	CVNA

Table 1: Top 20 trending stocks in WSB for the entire year

Always in Top 20	Annualized Daily Returns	Annualized Daily Volatility
GME	166,56%	172,96%
AMC	130,79%	225,60%
TSLA	19,75%	58,99%
PLTR	13,55%	69,38%
SPY	11,02%	17,65%
AAPL	17,18%	27,89%
AMD	27,08%	50,98%

Table 2: Annualized Returns and Volatility for stocks always in the top 20 in WSB

Always in Top 20	Market Cap $ Billion	Size
GME	$5.180	Mid
AMC	$1.210	Small
TSLA	$802.805	Large
PLTR	$36.029	Large
SPY	$450.835	Large
AAPL	$3.011.013	Large
AMD	$225.524	Large

Table 3: Market cap and size category for stocks always in the top 20 in WSB, as of 22/12/23

Size Category	# Stocks
Large	74
Mid	31
Small	51

Table 4: Number of stocks in each size category, as of 22/12/23

Industries	# Stocks
Finance, Insurance, Real Estate	58
Public Administration	48
Manufacturing	38
Services	30
Transportation, Communications, Electric, Gas, Sanitary Services	15
Retail Trade	10
Mining	3
Construction	2

Table 5: List of industries and the number of stocks that belong to them

Always in Top 20	Industry
GME	Retail Trade
AMC	Services
TSLA	Public Administration
PLTR	Services
SPY	Finance, Insurance, Real Estate
AAPL	Manufacturing
AMD	Manufacturing

Table 6: The always in top 20 of WSB stocks and their industry category

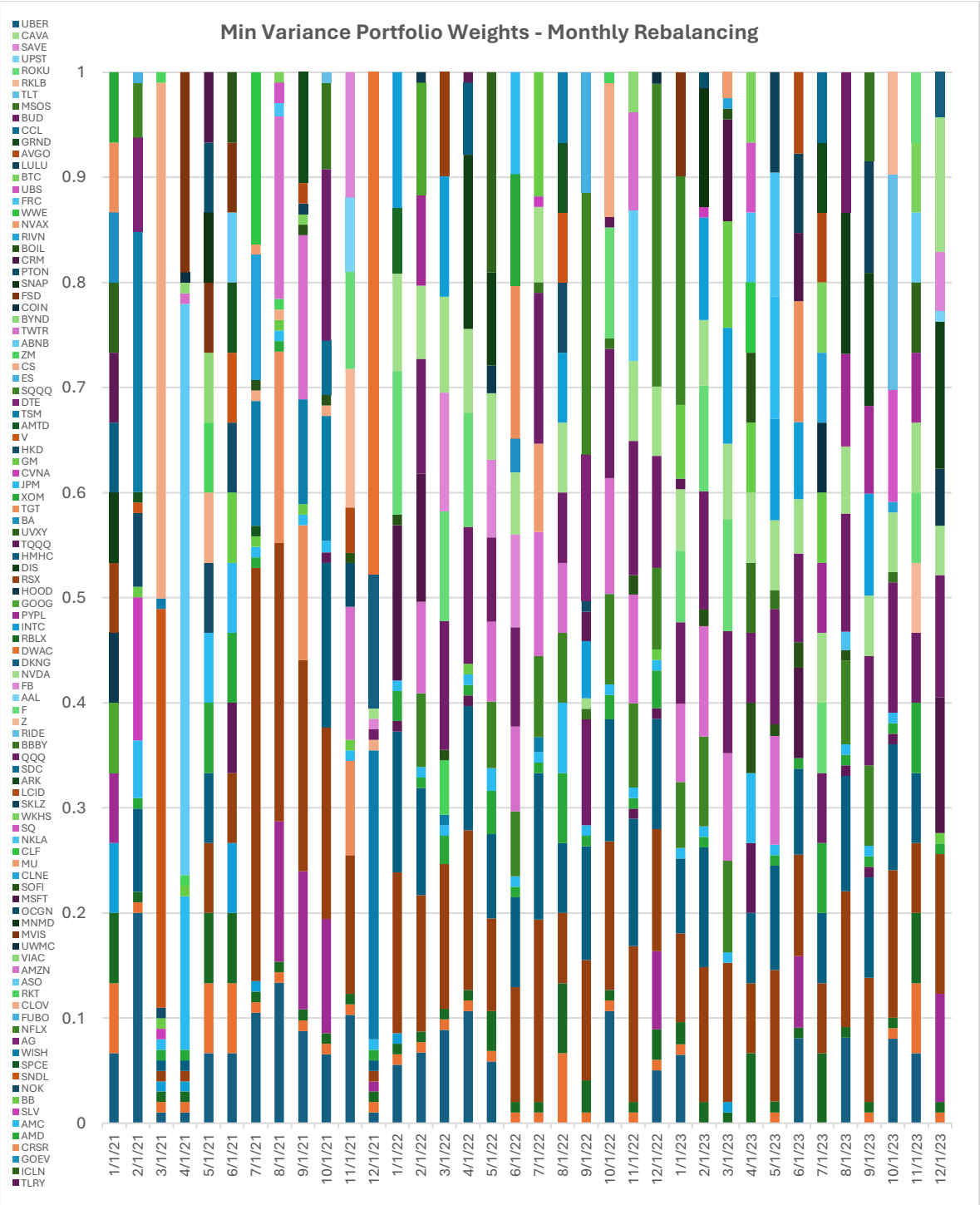

Figure 1: Min Variance Portfolio Weights - Monthly rebalancing

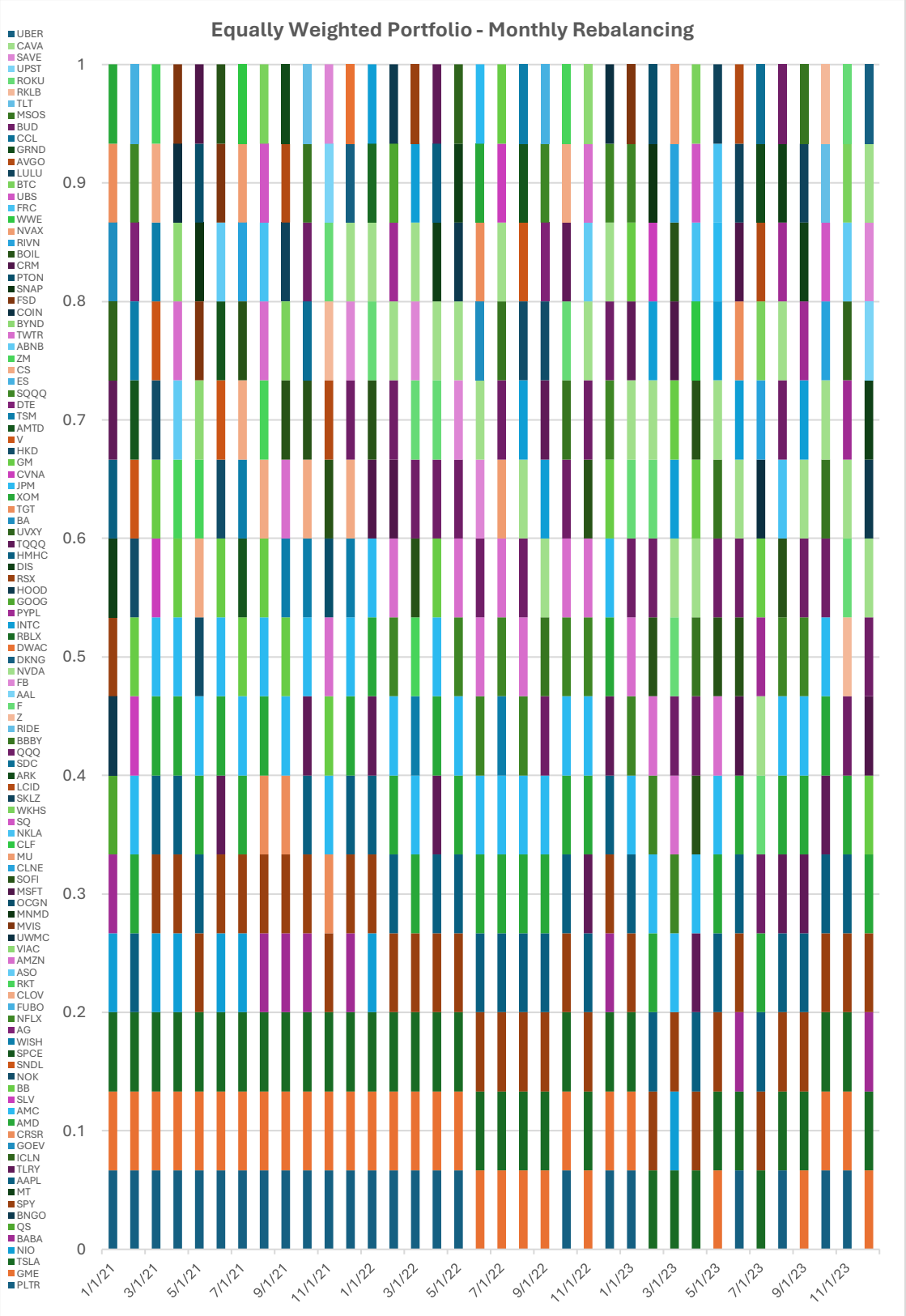

Figure 2: Equally Weighted Portfolio - Monthly rebalancing

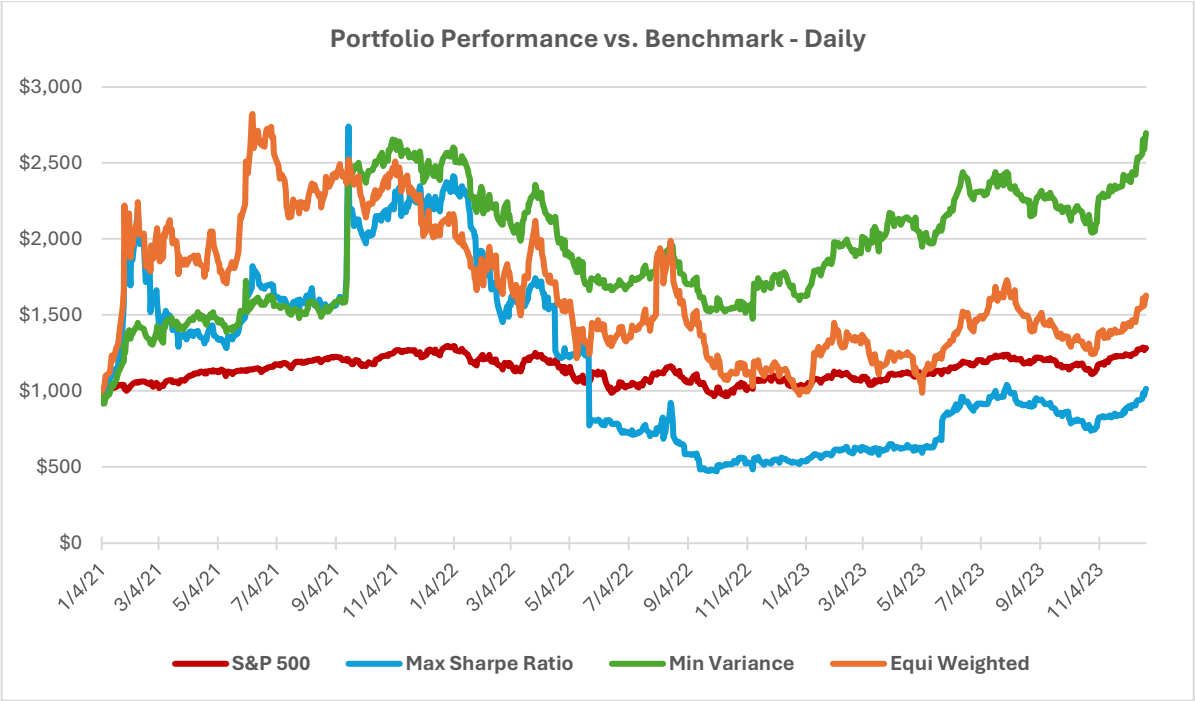

Figure 3: Portfolio Performance by Method of Optimization, Daily rebalancing

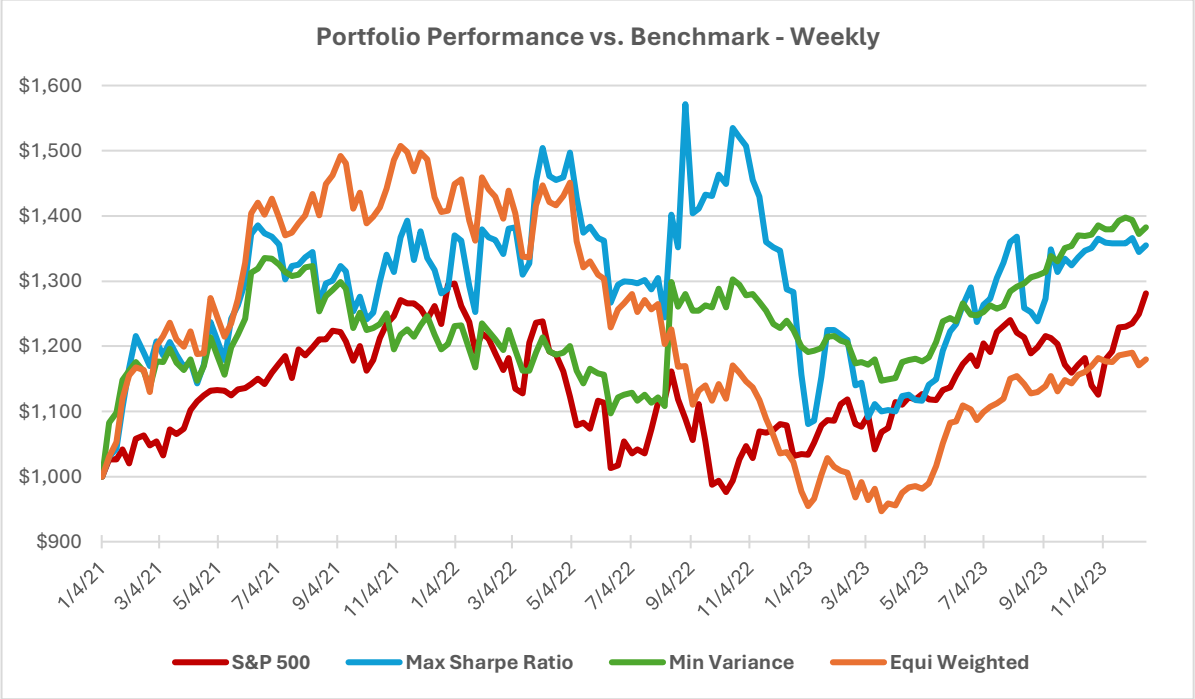

Figure 4: Portfolio Performance by Method of Optimization, Weekly rebalancing

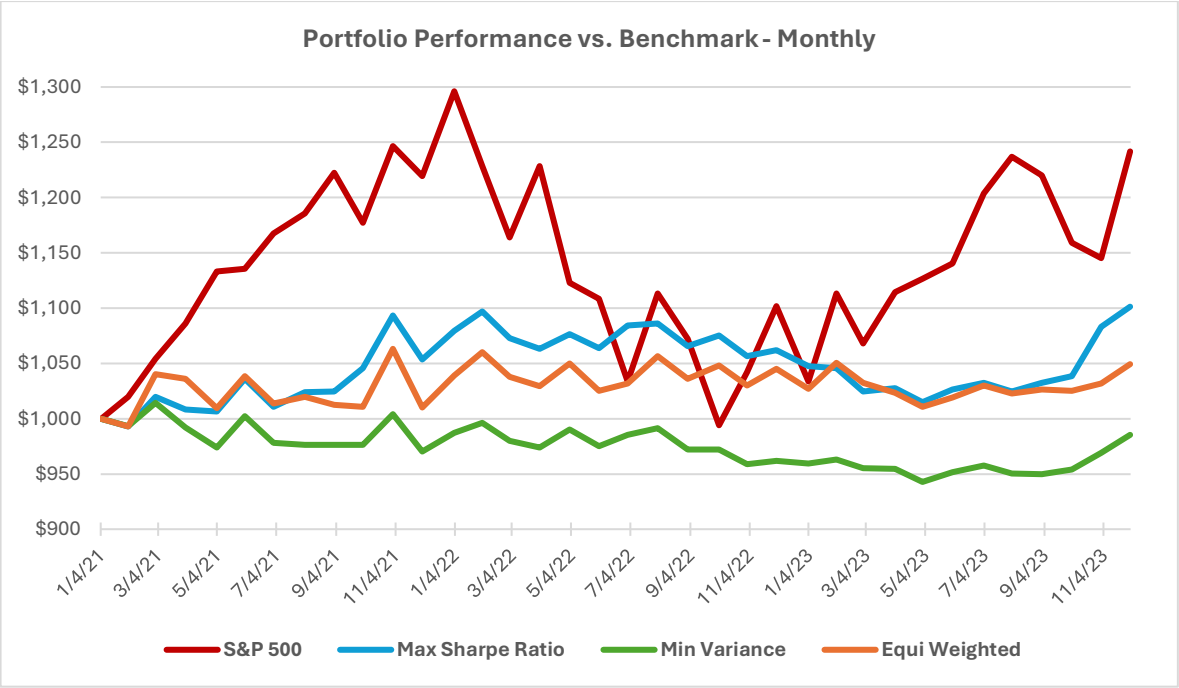

Figure 5: Portfolio Performance by Method of Optimization, Monthly rebalancing

Method	Max Sharpe Ratio			Min Variance			Equi-Weighted		
Rebalancing	Monthly	Weekly	Daily	Monthly	Weekly	Daily	Monthly	Weekly	Daily
Sharpe Ratio	0,1144	0,4114	0,2420	-0,6032	0,5568	0,9795	-0,1093	0,2427	0,4800
Information Ratio	-0,3002	0,1423	0,1478	-0,5338	0,1265	0,9360	-0,4118	-0,1273	0,4124
Annualized Alpha	0,0041 ns	0,0667 ns	0,0573 ns	-0,0336 ns	0,0649 ns	0,2614 ns	-0,0181 ns	0,0095 ns	0,1334 ns
Alpha p - value	0,9146	0,6501	0,8641	0,2641	0,4916	0,1486	0,6667	0,9232	0,6346
Annualized Mean Return	0,0342	0,1357	0,1905	-0,0037	0,1225	0,3945	0,0187	0,0715	0,3061
Annualized Volatility	0,0643	0,2624	0,5999	0,0508	0,1701	0,3585	0,0737	0,1802	0,5449
Max Value	$1.101,27	$1.571,45	$2.740,70	$1.014,27	$1.397,43	$2.697,34	$1.063,14	$1.507,38	$2.822,87
Min Value	$992,95	$1.000,00	$471,82	$942,76	$1.000,00	$917,82	$992,95	$946,72	$975,75
Avg Rebalancing Turnover	63,30%	53,53%	44,66%	57,69%	53,97%	37,08%	40,56%	35,66%	25,08%
Annualized Turnover*	8	28	112	7	28	93	5	19	63

Table 7 Summary of Metrics for Optimization Methods
** Number of times the portfolio is 100% changed in a year*

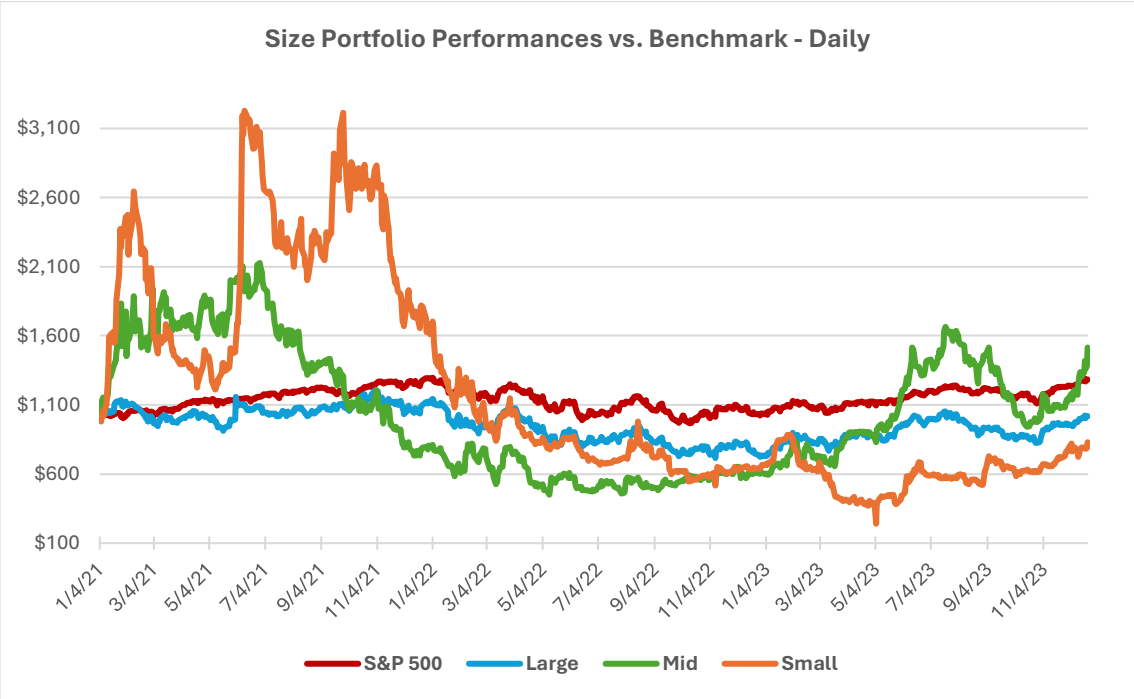

Figure 6: Portfolio Performance by Size, Min Variance, Daily rebalancing

Method	Min Variance		
Rebalancing	Daily		
Size	Large	Mid	Small
Sharpe Ratio	0,0573	0,4611	0,2158
Information Ratio	-0,2050	0,3850	0,1475
Annualized Alpha	-0,0982 ns	0,1944 ns	0,0574 ns
Alpha p - value	0,3995	0,5803	0,5803
Annualized Mean Returns	0,0526	0,3412	0,2478
Annualized Volatility	0,3064	0,6382	0,8160
Max Value	$1.203,88	$2.127,11	$3.228,03
Min Value	$715,62	$450,62	$240,83
Avg Rebalancing Turnover	32,52%	25,96%	10,66%
Annualized Turnover*	81	65	27

Table 8 Summary of Portfolios selected on Size
** Number of times the portfolio is 100% changed in a year*

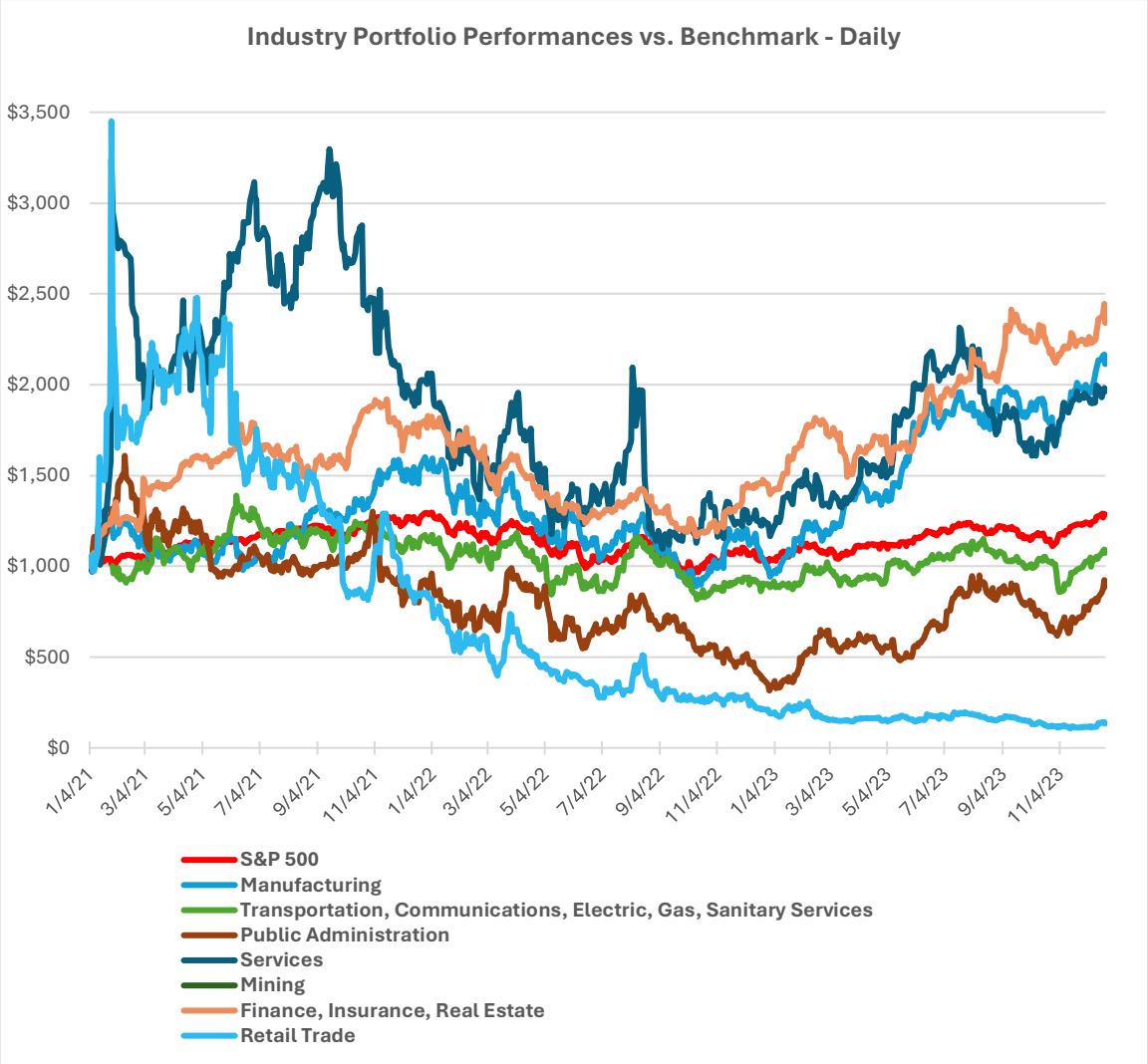

Figure 7: Portfolio Performance by Industry, Min Variance, Daily rebalancing

Method	Min Variance					
Rebalancing	Daily					
Industry	Manufacturing	Transportation, Communications, Electric, Gas, Sanitary Services	Public Administration	Services	Finance, Insurance, Real Estate	Retail Trade
Sharpe Ratio	0,7766	0,1898	0,2319	0,5441	1,0688	-0,4095
Information Ratio	0,8139	-0,0120	0,1350	0,4775	0,9893	-0,5107
Annualized Alpha	0,1381 ns	-0,0353 ns	-0,0423 ns	0,3200 ns	0,2149 ns	-0,4898 ns
Alpha p - value	0,3442	0,8249	0,8843	0,4819	0,1143	0,3013
Annualized Mean Returns	0,3275	0,0860	0,1806	0,4862	0,3307	-0,3025
Annualized Volatility	0,3721	0,3284	0,6022	0,8168	0,2822	0,8571
Max Value	$2.168,53	$1.389,27	$1.608,15	$3.297,01	$2.445,06	$3.450,44
Min Value	$889,44	$817,46	$315,75	$969,63	$1.000,00	$107,43
Avg Rebalancing Turnover	33,11%	2,92%	25,12%	37,93%	26,96%	5,28%
Annualized Turnover*	83	7	63	95	67	13

Table 9 Summary of Industry based portfolios

** Number of times the portfolio is 100% changed in a year*

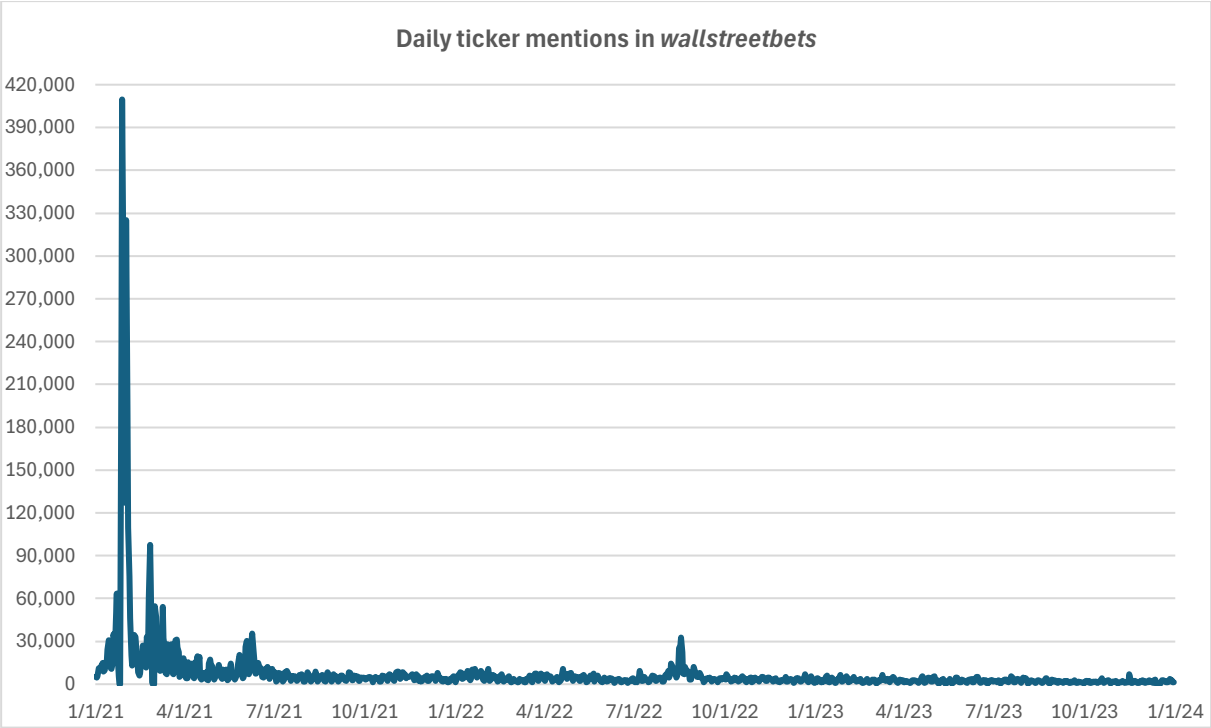

Figure 8: Daily ticker mentions in wallstreetbets from 2021 to 2023

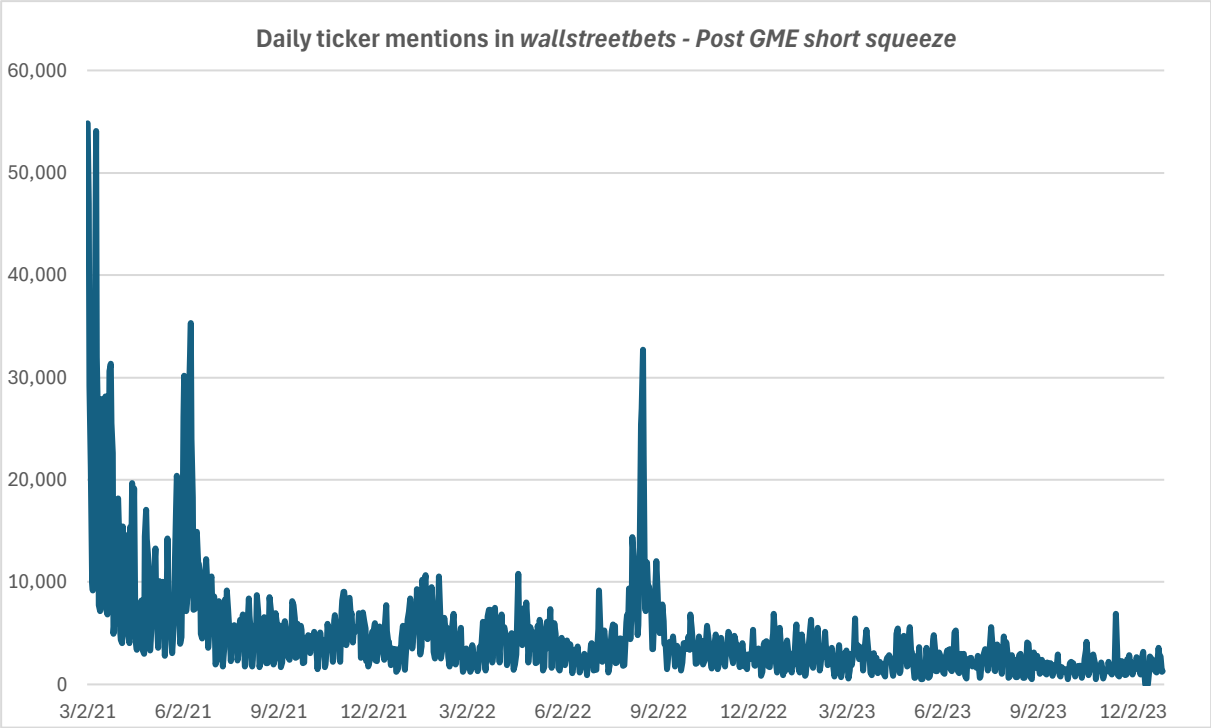

Figure 9: Daily ticker mentions in wallstreetbets - Post GME short squeeze

Year	Total Mentions in WSB
2021	5.524.579
2022	1.651.157
2023	825.955

Table 10: Total yearly ticker mentions in wallstreetbets